GUIDELINES FOR LAND APPLICATION AND STORAGE OF BIOSOLIDS IN NOVA SCOTIA

DRAFT

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NOVA SCOTIA

Environment and Labour

1.0 GENERAL

There are three options for the management of biosolids in Nova Scotia, which include landfilling, incineration, and land application. These Guidelines consider land application only as other guidance documents pertain to landfilling and incineration.

1.1 Background

Biosolids are primarily organic materials produced during the treatment of domestic sewage and septage sludges, which have been further treated to reduce pathogen content. They include the solid, semi-solid, and liquid residue removed from primary, secondary, or advanced wastewater treatment processes, but do *not* include screenings removed during primary treatment. These materials must be removed and disposed of in an approved manner.

Due to their high nutrient content, biosolids can be applied to land as a fertilizer or soil amendment, a process which is referred to as *land application*. Land application of biosolids can be beneficial, for example, by improving crop production, reducing soil erosion, reclaiming strip-mined lands, enriching forest lands, and conserving landfill space. When land applying biosolids, controls must be in place in order to protect environmental quality, consumer and animal health, food quality, and the productivity of the land.

1.2 Purpose

The purpose of these Guidelines is to:

a) Facilitate the beneficial use of biosolids through land application, while protecting the environmental and human health from adverse effects.

b) Provide guidance as to the requirements to obtain an Approval to land apply and/or store biosolids in Nova Scotia.

1.3 Legislation

a) Section 50(2) of the Environment Act, S.N.S. 1994-95, c. 1, reads as follows:
"*No person shall commence or continue any activity designated by the regulations as requiring an Approval, unless that person holds the appropriate approval*".

b) Section 3(1) of the Activities Designation Regulations (O.I.C. 95-286) reads as follows:
"*Any activity designated in these regulations requires an approval from the Minister or an Administrator designated by the Minister*".

c) Section 23 of the Activities Designation Regulations (O.I.C. 95-286) reads:
"*The application to land of non-livestock generated wastes, wastewater and wastewater sludges is designated as an activity*".

d) Section 8(2)(b) of the Environment Act, S.N.S. 1994-95, reads as follows:

Duties of Minister

8(2) *The Minister, for the purposes of the administration and enforcement of this Act, and after engaging in such public review as the Minister considers appropriate, shall*

b) *establish and administer policies, programs, standards, guidelines, objectives, codes of practice, directives and approval processes pertaining to the protection and stewardship of the environment.*

1.4 **Applicability**

a) These Guidelines are intended for biosolids produced during the treatment of domestic wastewater or septage, as well as any mixture that contains biosolids.

b) These Guidelines apply to any land which is intended for the application or storage of biosolids.

c) With the exception of Sections 3 and 4, these Guidelines do not apply to land application of biosolids that meet the Exceptional Quality classification. An Approval is required as per Section 7(2)(a)of the *Activities Designation Regulations* to operate a sewage treatment facility, whereby regular monitoring and sampling of biosolids will be required to ensure that they meet the Exceptional Quality (EQ) biosolids criteria.

d) With the exception of Sections 3 and 4, these Guidelines do not apply to land application of biosolids that are regulated as a fertilizer or supplement by the Canadian Food Inspection Agency (CFIA) under the Canadian Fertilizer Act. An Approval is required as per Section 7(2)(a)of the *Activities Designation Regulations* to operate a sewage treatment facility, whereby regular monitoring and sampling of the biosolids will be required to ensure that they meet the Class A biosolids criteria.

2.0 APPLICATIONS FOR APPROVAL

a) To obtain an Approval to land apply and/or store biosolids in Nova Scotia, a completed application form must be submitted to the Department.

b) More than one land application site can be identified on an Approval. If an Approval holder wishes to add additional land application sites to the Approval, an amendment to the Approval or letter of authorization from the Department is required. Approvals can be valid for up to ten years.

c) Applications must be accompanied by supporting documentation, which must contain all requirements outlined in Schedule 2 of these Guidelines, and must be to the satisfaction of the

Department.

3.0 BIOSOLIDS STABILIZATION

Only stabilized biosolids can be applied to land. Stabilization reduces pathogen concentration, helps minimize odour generation, and reduces vector attraction potential. Biosolids may be defined as stabilized if one of the following conditions is met:

a) volatile solids in sewage sludge have been reduced by at least 38% during treatment

b) the specific oxygen uptake rate (SOUR) of the sewage sludge is less than 1.5 mg O_2/hr/g. of total sludge on a dry weight basis corrected to 20 °C. This test is only applicable to liquid aerobic biosolids withdrawn from an aerobic process.

c) sufficient alkaline material has been added to the sewage sludge in order to produce a homogenous mixture with a minimum pH of 12 after 2 hours of vigorous mixing. Facilities adding supplemental alkaline material must maintain the pH of the sludge during interim sludge storage periods.

The following stabilization methods have been approved by the Department, which are defined in Schedule 1 of these Guidelines. Other stabilization methods may be acceptable upon Departmental review and approval.

- aerobic digestion
- anaerobic digestion
- alkaline/lime stabilization
- composting
- heat drying
- heat treatment
- pasteurization

Proponents must provide sufficient information acceptable to demonstrate that the biosolids have been effectively stabilized as defined in Table 2.

4.0 BIOSOLIDS QUALITY CRITERIA

Biosolids quality is determined by the pathogen and metal content and is dependent on the wastewater characteristics and the type of treatment. Biosolids acceptable for land application and/or storage in Nova Scotia will fall into one of three categories, depending on the metal and pathogen content: Exceptional Quality (EQ), Class A, or Class B. There are no restrictions for land application of EQ biosolids or biosolids regulated under the Canadian Fertilizer Act, and no Approval is required. However, land application of either Class A or Class B biosolids requires an Approval, and restrictions pertaining to the use of these products will apply.

4.1 Metals (Inorganic Pollutants)

All biosolids contain heavy metals. Small amounts of metals in biosolids can be beneficial for plant growth; however, larger concentrations of metals may be harmful. All biosolids applied to land must not exceed the *Maximum Acceptable Metal Concentrations* from one of the columns listed in Table 1.

Table 1: Maximum Acceptable Metal Concentrations in Biosolids (mg/kg of dry weight)

Metal	Exceptional Quality	Class A/Class B
Arsenic	13	75
Cadmium	3	20
Chromium	210	1060
Cobalt	34	150
Copper	400	760
Mercury	0.8	5
Molybdenum	5	20
Nickel	62	180
Lead	150	500
Selenium	2	14
Zinc	700	1850

4.2 Pathogen Content

Pathogens are disease causing organisms, such as bacteria, viruses, and parasites and exist in all biosolids. The pathogen reduction requirements for each of the three categories of biosolids are listed in Table 2.

Table 2: Pathogen Reduction Requirements

Exceptional Quality	Class A	Class B
Fecal Coliform: <1000 MPN*/g total solids (dry weight) OR Salmonella: <3 MPN*/4g total solids (dry weight)	Fecal Coliform: <1000 MPN*/g total solids (dry weight) OR Salmonella: <3 MPN*/4g total solids (dry weight)	Fecal Coliform: <2,000,000 MPN* per gram of total solids (dry weight)

Note: * MPN (most probable number)

5.0 SITE SELECTION CRITERIA

5.1 Soil Requirements

5.1.1 pH

The soil on which biosolids are applied must have a pH between 6.0 and 8.0, to minimize metal leaching. Alkaline stabilized sludges may be applied to soil with a lower pH, provided they will raise the soil pH to at least 6.0 after application of biosolids. The pH of the soil shall be maintained above 6.0 for at least two years following the end of biosolids application.

5.1.2 Metals (Inorganic Pollutants)

Table 3 identifies the Maximum Acceptable Metal Concentrations in Soils. Biosolids must not be land applied if metals in the soil exceed these concentrations. Natural background metal concentrations in soil may exceed the criteria listed in Table 3; metals that exceed background concentrations will be evaluated on a case by case basis.

Table 3: Maximum Acceptable Metal Concentrations in Soils (mg/kg of dry weight)

Metal	Maximum Acceptable Concentrations in Soils*		
	Agricultural Land Use	Commercial Land Use	Industrial Land Use
Arsenic	12	12	12
Cadmium	1.4	22	22
Chromium	64	87	87
Cobalt	40	300	300
Copper	63	91	91
Mercury	6.6	24	50
Molybdenum	5	40	40
Nickel	50	50	50
Lead	70	260	600
Selenium	1.0	3.9	3.9
Zinc	200	360	360

Note: *Canadian Council for Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines.

5.2 Separation Distances

Land application sites must meet or exceed the minimum separation distances identified in Table 4. The separation distances are designed to protect water quality, both surface and groundwater, and human health. In more environmentally sensitive areas (i.e., in close proximity to a municipal well) the separation distances may be increased.

Table 4 - Minimum Separation Distances (meters)

Type of Feature	Minimum Separation Distance
Public Wells	150 [1, 2]
Private Wells	90 [1, 2]
Property Line	10
Bedrock Outcrops	10
Dwellings	90 [1]
Institutional Buildings (i.e, schools and hospitals)	200 [1]
Commercial buildings	90
Uninhabited Buildings	30
Public Areas (i.e., parks and playgrounds)	90
Perennial Water Bodies & Watercourses	90 [2]
Intermittent Water Bodies & Watercourses	60 [2]
Swales and Man-Made Drainage Ditches	15
Primary and Secondary Roads	30
Unimproved Dirt Roads	10

Note: 1 - 300 m required for biosolids storage areas
2 - refer to section 5.4 below

5.3 Depth to Groundwater and/or Bedrock

For soils with a lower permeability (< $8x10^{-6}$ m/s) such as clay and silt, biosolids must not be applied to land where the depth to the groundwater table and/or bedrock is less than one meter below the soil surface. For soils with a higher permeability (>$8x10^{-6}$ m/s) such as sand and gravel, biosolids must not be applied to land where the depth to the groundwater table and/or bedrock is less than 1.5 meters below the soil surface.

One method of determining the depth to the water table and/or bedrock is by excavating test pits to the 1.5 meter depth. The number of test pits to be excavated across the site is dependent on the size of the application site and topography. The depth to the water table shall be determined during late spring or early summer when the water table is usually at its highest level.

5.4 Land Slope

If the sustained slope of the land is less than 3%, the required minimum separation distance between the land application site and the adjacent watercourses and public and private wells is as noted in Table 4. If the sustained slope of the land is between 3% and 8%, the required minimum separation distance between the land application site and adjacent intermittent and perennial watercourses and public and private wells is 200 meters. If the sustained slope of the land exceeds 8%, land application of Class A or Class B biosolids is not permitted.

5.5 Flood Risk Areas

Additional controls are required when biosolids are applied in flood risk areas. A flood risk area is a flat or gently sloping area beside a watercourse which may be subjected to flooding. The land application of both Class A and Class B biosolids in a flood risk area, which may experience flooding once in 20 years, must not occur before the risk of flood has passed, any flood waters have returned to their normal level, and the soil is adequately drained to support application equipment. Class A and Class B biosolids applied to land within flood risk areas must be directly injected into the soil or surface applied followed by incorporation (within 24 hours of application). The storage of Class A or Class B biosolids is not permitted in a flood risk area which may experience flooding once in 100 years.

5.6 Conformity with Municipal Planning Regulations/By-Laws

Land application and/or storage of biosolids must be in conformity with municipal planning regulations/by-laws. Prior to submission of an application to land apply and/or store biosolids, applicants must obtain any required municipal approval, permit, or other authorization from the local municipality. Applicants must check with municipalities to identify the location(s) of source water protection areas and to determine whether or not land application and/or storage of biosolids is permitted in these areas.

6.0 SITE RESTRICTIONS

6.1 Land Use Restrictions and Waiting Periods

Land on which Class B biosolids have been applied must adhere to the waiting periods identified in Table 5. In addition, Class A and Class B biosolids are not permitted for use on residential lawns and gardens.

Table 5: Minimum Waiting Periods

Land Use	Waiting Period
Pasture	2 months before grazing
Forage	2 months before harvest
Livestock feed	2 months before harvest
Food crops (edible parts below the soil surface)	38 months before harvest
Food Crops (edible parts above the soil surface)	18 months before harvest
Commercial sod	12 months before harvest

6.2 Signage Requirements for Application Sites

Application sites where Class A and Class B biosolids have been applied require appropriate signage to identify the site as having received biosolids. Signs must be placed at all four corners of the application site as well as on each access road or path into the site. For Class B biosolids signs must remain in place for 38 months following the most recent application. Application sites where Class A biosolids have been applied, temporary signage (2 months) is required. Typical signage shall include the following wording:

Biosolids Application Site
Proponent Name
Identify Biosolids Source(s)
Field No. 1; NE Corner
Date of Application

Font size identifying "Biosolids Application Site" shall not be less than 50 mm in height. All other wording shall have a font size not less than 20 mm in height. Signs shall be reflective and constructed of weather resistant materials (i.e., painted or sealed pressure treated wood or resistant wood species; metal) affixed on pressure treated wood or hot-dip galvanized metal posts. The base of the posts shall be buried a minimum of 60 cm below grade. Deeper burial may be required if weather conditions mandate. Signs shall be affixed to posts using hot dip galvanized lag bolts or stainless steel fasteners.

7.0 BIOSOLIDS APPLICATION RATE AND METHODOLOGY

7.1 Nutrient and Land Management Plans

Land application of biosolids, when pertaining to agricultural land, shall follow a Nutrient Management Plan or, when pertaining to land other than that used for agricultural purposes, i.e., reclamation sites, a Land

Application Plan.

7.1.1 Nutrient Management Plan (NMP)

The nutrient management plan(NMP) shall be prepared by a certified nutrient management planner and shall outline crop requirements and biosolids parameters (i.e., nutrients and organics). The NMP shall determine the biosolids application rate based on the agronomic rate (biosolids must be applied at a rate that is equal to or less than the agronomic rate). The agronomic rate is the biosolids application rate (on a dry weight basis) that is designed to provide the amount of nutrients that are needed by the crop, while minimizing the amount of nutrients that may leach into the groundwater. Biosolids should be applied as close to the time of maximum nutrient uptake by crops as feasible. The application rate shall ensure that metal concentrations in soils do not exceed the limits specified in Table 3.

7.1.2 Land Application Plan (LAP)

The land application plan (LAP) must be completed by a professional engineer or agrologist. It shall outline crop/vegetation requirements and biosolids parameters (i.e., nutrients and organics), and shall determine application rates based on nutrient and organic matter requirements. The rate of application must ensure that the appropriate amount of nutrients is applied to the soil in order to prevent groundwater contamination. The application rate shall ensure that metal concentrations in soils do not exceed the limits specified in Table 3.

7.2 Acceptable Application Methods

With the exception of flood risk areas, Class A biosolids may be land applied by surface spreading as a top dressing or through incorporation, or by injection below the surface of the soil. Class B biosolids may be surface spread followed by incorporation, or may be injected below the surface of the soil. For Class B biosolids, incorporation must take place within 24 hours following application.
For both Class A and Class B biosolids, land application is not permitted when the ground is frozen, snow covered, or saturated. Biosolids must not be applied to land following heavy rains or when heavy precipitation is forecasted.

7.3 Best Management Practices

The Department recommends that the Approval holder carry out best management practices for soil conservation and erosion control.

8.0 BIOSOLIDS STORAGE

The storage of biosolids may be required at times when land application is not possible, for example, during inclement weather or unsuitable soil conditions. Sufficient storage shall be available to retain biosolids

during these circumstances. The on-site storage of Class A or Class B biosolids must be approved in writing by the Department.

Class A and Class B biosolids with a minimum solids content of 20% may be stockpiled, or stored temporarily, at the application site prior to land application, provided that the biosolids are intended for use at that location. Biosolids can be stockpiled without an impermeable surface for up to two weeks prior to land application, unless otherwise approved in writing by the Department. Stockpiled biosolids must adhere to the requirements of these Guidelines (i.e., minimum separation distances and slope), and must be fully covered with an impermeable material, such as a tarp. Stockpiles must be located to minimize contact with surface water run-off and to prevent infiltration of precipitation and the generation of leachate.

Class A and Class B biosolids with a minimum solids content of 20% may be stored for more than two weeks on top of an impermeable surface such as a concrete pad or clay liner. The impermeable surface shall have curbed sidewalls or berms on all sides constructed of the same material. Clay liners shall have a minimum thickness of 0.5 meters and an in-situ coefficient of permeability of 1.3×10^{-6} cm/sec. Such biosolids storage areas must adhere to the requirements of these Guidelines (i.e., minimum separation distances and slope), and shall be fully covered with an impermeable material, such as a tarp. In addition, such storage areas shall be located to minimize contact with surface water run-off and to prevent infiltration of precipitation and the generation of leachate.

The storage of Class A and Class B biosolids with a solids content of less than 20% must be in lagoons only. Storage lagoons shall be designed by a qualified professional engineer licensed to practice in Nova Scotia and in accordance with the *Atlantic Canada Standards and Guidelines Manual for the Collection, Treatment, and Disposal of Sanitary Sewage*. Storage lagoons must adhere to the separation distances identified in Table 4.

9.0 MONITORING, REPORTING, AND RECORD KEEPING

9.1 Monitoring

9.1.1 Biosolids Quality

The Approval holder must monitor the quality of the biosolids received from each source. Prior to receipt of biosolids from each source and every 2000 tonnes from each source thereafter, composite biosolids samples shall be collected from each source and analyzed for the parameters identified in Schedule 3 of these Guidelines. All biosolids samples must be collected following a consistent and acceptable sampling procedure, and shall be analyzed by a CAEAL (Canadian Association for Environmental Analytical Laboratories) certified laboratory.

9.1.2 Soil Quality

The Approval holder must monitor the quality of the receiving soils. Each year, prior to the initial application of biosolids, a composite soil sample must be collected from the application site and analyzed for the parameters identified in Schedule 3 of these Guidelines. Following a maximum of five biosolids applications, the application site shall be re-sampled and analyzed for the same parameters. The composite soil sample(s) collected must be representative of the application site, collected following a consistent and acceptable sampling procedure, and analyzed by a CAEAL (Canadian Association for Environmental Analytical Laboratories) certified laboratory.

9.1.2 Groundwater Quality (Drinking Water Wells)

The Approval holder must monitor all drinking water wells within 500 meters of each application site, with the consent of the homeowner(s). Prior to the initial application of biosolids, each well shall be sampled and analyzed for the parameters identified in Schedule 3 of these Guidelines, in order to establish baseline data. Thereafter, as long as biosolids are being applied, the same wells shall be sampled quarterly for total and fecal coliform and annually for the metal and chemical parameters identified in Schedule 3 of these Guidelines. Following receipt of the sample results, a copy of the analysis shall be provided to the well owner. All groundwater samples must be collected following a consistent and acceptable sampling procedure, and shall be analyzed at a CAEAL (Canadian Association for Environmental Analytical Laboratories) certified laboratory.

In environmentally sensitive areas, the Approval holder may be required to install observation well(s) between the application site and the nearest down gradient drinking water well, which will be monitored for the same parameters at the same frequency. In addition, the Department may increase the monitoring frequency if necessary.

9.2 **Reporting**

Approval holders must submit an annual report to the Department. A detailed list of the information that must be included in each annual report is outlined in Schedule 4 of these Guidelines.

9.3 **Record Keeping**

The Approval holder must collect, record, and make available, the following information:

- biosolids analysis based on the sampling schedule specified in the Approval
- soil analysis and sample locations, based on the sampling schedule specified in the Approval
- biosolids and soil sampling procedures followed during sample collection
- date and amount of biosolids delivered to each site
- land application details for each application site, including the date(s) of application, method(s) of application, and the amount of biosolids applied
- detailed cropping information for each site
- record of complaints and how they were handled
- any other information required or specified in the Approval
- water quality analysis results

- water quality sampling procedures followed during sample collection

The records must be maintained for a minimum period of five years following biosolids application, and must be made readily available to the Department upon request.

10.0 CONTINGENCY PLAN

Applications for Approval for land application and/or storage of biosolids must be accompanied by a contingency plan. The contingency plan shall identify remedial measures to be taken in the event that situations such as biosolids runoff, groundwater and/or surface water impacts, public complaints, and spills are encountered.

11.0 PUBLIC CONSULTATION

Public consultation by the applicant is required. Applications for Approval for land application and/or storage of biosolids must be accompanied by a detailed summary of the public consultation undertaken by the applicant, which shall include the methods utilized, (i.e., public meetings or information sessions), groups or individuals targeted, feedback received, and how issues or concerns have been addressed. The public consultation shall be representative of the community in which the proposed land application and/or storage of biosolids will take place.

SCHEDULE 1
GLOSSARY OF TERMS

Aerobic digestion — The degradation of organic matter brought about through the action of micro-organisms in the presence of oxygen for purposes of stabilization, volume reduction, and pathogen reduction.

Agricultural land — Land on which food, feed, or fibre crops are grown. This includes range land and/or land used as pasture. In this document, this term also covers silviculture.

Agronomic Rate — the application rate designed to provide the amount of nutrients needed by a crop or vegetation and to minimize the leaching of nutrients into the water table.

Alkaline stabilization — See "lime stabilization".

Anaerobic digestion — The degradation of organic matter brought about through the action of micro-organisms in the absence of oxygen for purposes of stabilization, and pathogen reduction.(Mesophilic operating range 35-38 ^{o}C. Thermophilic operating range greater than 55 ^{o}C.)

Application Site — See "land application site"

Beneficial use — Taking advantage of the nutrient content and soil conditioning properties of a biosolids product to supply some or all of the fertilizer needs of an agronomic crop or for vegetative cover (in land reclamation, silviculture, landfill cover, or similar ventures).

Biosolids — An organic, stabilized material produced during the treatment of domestic sewage (some facilities may also receive a commercial and industrial component) and septage sludges. Biosolids must meet the regulations of the jurisdiction in which they are produced or applied. Biosolids differ from sewage sludge in that they have been treated to reduce pathogen content.

Biosolids application rate — The maximum amount of biosolids on a dry weight basis that can be applied to a land application site, usually defined in dry tonnes/hectare.

Composting — A stabilization process where organic material undergoes biological degradation to a stable end product. Biosolids that has been composted properly is a sanitary, nuisance-free, humus-like material. Approximately 20% to 30% of the volatile solids are converted to carbon dioxide and water. As the organic material in the biosolids decomposes, the compost heats to temperatures in the pasteurization range of 50 to 70□C, and enteric pathogenic organisms are destroyed.

Department — The Nova Scotia Department of Environment and Labour.

Heat drying — Heat drying of biosolids involves the supply of auxillary heat to mechanic drying processes inorder to increase the vapour holding capacity of the ambient air and to provide the latent heat necessary for evaporation. Temperatures greater than 80□C are required.

Heat treatment — Heat treatment is a continuous process in which biosolids are heated in a pressure vessel to

temperatures up to 260□C for approximately 30 minutes. This serves as both a stabilization process and a conditioning process. It conditions the biosolids by rendering the solids capable of bein dewatered without the use of chemicals. When biosolids are subjected to the high temperatures and pressures, the thermal activity releases bound water and results in the coagulation of solids. In addition, hydrolysis of proteinaceous materials occurs, resulting in cell destruction and release of soluble organic compounds and ammonia nitrogen.

Land application — The placement of biosolids on land at a predetermined rate (see biosolids application rate) to support vegetative growth either on the surface or in the subsurface.

Land application site — An area of land covered by an Approval on which biosolids are applied to condition the soil, fertilize crops, or promote vegetative growth.

Lime stabilization — A process in which sufficient lime is added to biosolids to produce a highly alkaline sludge (pH of 12 after two hours of contact). Also called alkaline stabilization.

Nutrient — Any substance that is required for plant growth. The term generally refers to nitrogen, phosphorus, and potassium in agriculture, but can also apply to other essential and trace elements.

Pasteurization — Biosolids are heated to 70□C for 30 minutes to destroy pathogens.

Pathogens — Organisms such as bacteria, protozoa, viruses, and parasites causing disease in humans and animals. Examples of pathogens that can be present in biosolids are salmonella, coliform, shigella, escherichia coli, hepatitis A virus, rotavirus, polio viruses, cryptosporidium and giardia lamblia. Indicator pathogens are typically used to test for pathogens. Fecal coliform is mainly used as an indicator, however salmonella sp. may also be used.

Separation Distances (Set-backs) — An area of land that designates a zone of separation between the application site and nearby receptors (i.e., humans) and pathways (i.e., drinking water wells and surface water features), designed to protect environmental quality and human health.

Septage Sludge — The organic materials resulting from the treatment of septage removed from septic tanks, holding tanks, vault privies, etc.

Sewage Sludge — The solid, semi-solid, or liquid residue generated during the wastewater treatment process.

Soil amendment — Anything that is added to the soil (i.e., lime, gypsum, inorganic fertilizers and organic material, including biosolids) to improve its physical or chemical condition for plant growth.

Stabilization — Stabilization of biosolids reduces pathogen concentration, helps minimize odour generation, and reduces vector attraction potential.

Vector attraction — The characteristic of biosolids that attracts rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents, such as pathogens.

SCHEDULE 2

SUPPORTING DOCUMENTATION SUBMISSION REQUIREMENTS

As stated in Section 2.0, and pursuant to Section 5(1) of the Approval Procedure Regulations, an application for Approval for land application and/or storage of biosolids must be accompanied by additional supporting documentation, which must contain the following information:

1. Source(s) of biosolids
2. Proposed biosolids stabilization method(s)
3. Application method(s)
4. Biosolids quality analysis, including both a summary table, with comparison to the criteria stated in this Guideline, and the laboratory certificates of analysis; samples must be collected and analyzed as per Schedule 3 of these Guidelines
5. Soil quality analysis, including both a summary table, with comparison to the metals stated in these Guidelines, and the laboratory certificates of analysis; samples must be collected and analyzed as per Schedule 3 of these Guidelines
6. A scaled site plan, which identifies the property in question and a minimum of a 1 kilometer radius surrounding the property; the plan shall identify the following:
    - application site(s)
    - existing and proposed biosolids storage areas, if applicable
    - surface water features, including perennial and intermittent water bodies and watercourses, swales, and manmade drainage ditches
    - roads, including primary, secondary, and dirt roads
    - neighboring land uses, including the location of residential areas
    - property boundaries
    - dwellings, schools, churches, businesses, etc.
    - uninhabited buildings
    - drinking water supply wells, both private and municipal, within 500 meters
7. Scaled topographical map
8. Aerial photograph
9. Depth to groundwater and bedrock, and the methods utilized to obtain this data
10. Letter from the local municipality stating that the proposed activity is in conformity with municipal planning regulations/by-laws.
11. If applicable, the construction details of biosolids storage areas. For storage lagoons, a letter from a professional engineer licensed to practice in Nova Scotia stating that the lagoon has been constructed as per these Guidelines is required.

12. Contingency plan

13. Public consultation plan and results

SCHEDULE 3
REQUIRED SAMPLING PARAMETERS

PARAMETER	MEDIUM		
	Biosolids	Soil	Groundwater
total coliform (MPN)			☐
fecal coliform (MPN)			☐
fecal coliform or salmonella (MPN)	☐		
alkalinity			☐
ammonia			☐
arsenic	☐	☐	☐
cadmium	☐	☐	☐
calcium			☐
chloride			☐
cobalt	☐	☐	☐
conductivity (laboratory)			☐
conductivity (field)			☐
copper	☐	☐	☐
chromium	☐	☐	☐
total organic carbon			☐
iron			☐
lead	☐	☐	☐
magnesium			☐
manganese			☐
mercury	☐	☐	☐
molybdenum	☐	☐	☐
nickel	☐	☐	☐
nitrate			☐

PARAMETER	MEDIUM		
	Biosolids	Soil	Groundwater
nitrite			□
pH (laboratory)	□	□	□
pH (field)			□
potassium			□
sodium			□
selenium	□	□	□
sulphate			□
total dissolved solids			□
total kjeldahl nitrogen			□
total phosphorus			□
zinc	□	□	□

SCHEDULE 4
ANNUAL REPORTING REQUIREMENTS

Each year, prior to land application, the Approval holder must submit to the Department an annual report which shall contain the following information:

a) The total quantity of biosolids received in the past year, the source(s) of the biosolids, and the quantity of biosolids received from each source

b) Biosolids stabilization method(s)

c) The details of sampling undertaken for biosolids quality (when the sample was collected, how, and by whom), a summary of the analytical results in comparison to the criteria outlined in this Guideline, and the laboratory certificates of analyses

d) A detailed list of all fields authorized for application or spreading in that calendar year

e) A site plan which identifies the location(s) of biosolids application

f) Biosolids application details for each application site, including the date(s) biosolids were applied, the application rate, and the volume of biosolids applied

g) The details of the soil sampling undertaken on each application site (when the sample was collected, how, and by whom), a summary of the analytical results in comparison to the criteria outlined in this Guideline, and the laboratory certificates of analyses

h) The details of the water sampling undertaken at domestic wells (when the sample was collected, how, and by whom), a summary of the analytical results in comparison the Guidelines for Canadian Drinking Water Quality, and the laboratory certificates of analyses

i) A copy of the nutrient or land management plan

In addition to submission of the annual report, the Applicant must also arrange for a site visit with representatives of the Department.